

Sales activity is only known for the aggregate of the agent and its sub-agents and the ability to accurately and forecast sales from the agents individually is not possible.

In the retail industry data collection devices are used at the point-of-sale (POS) to obtain product information from a label attached to the product. This label is typically in the form of an RF tag or bar code that is read at the POS by a scanner or bar code reader. However, this can only be effected where the retail outlet has a scanner or the product includes such an identifier and there is a mechanism to recognise the products. There are many products that do not include RF tags or for which tags are not economic. Furthermore, these POS devices do not necessarily accurately account for stock levels as they do not account for loss of product through shoplifting or, in the case of perishables, as a result of spoiling.

#### SUMMARY OF THE INVENTION

According to one aspect of the present invention there is provided a method of managing product inventory levels, said method comprising the steps of:

monitoring the flow of product from one or more outlets at the point of display to obtain product flow data for each said outlets;  
capturing the product flow data in real time and at a location remote from the outlets;  
and  
depending on the product flow data at the point of display for each of said outlets,  
controlling the delivery of product to said outlets to control their inventory.

Preferably the step of monitoring the flow of product includes monitoring the removal of product inventory from each of the outlets. Even more preferably the removal of the product inventory is monitored by counting the number of products departing the outlet. One embodiment of this counting of the product is effected by weighing a supply of the product and monitoring the weight loss which will be proportional to the number of products departing the outlet.

According to another aspect of the present invention there is provided a method of managing product inventory levels, said method comprising the steps of:

monitoring the flow of product from one or more outlets to obtain product flow data for each of said outlets, said monitoring being effected by measuring changes in the weight of a supply of the product as a result of depletion or addition of product from or to the supply;

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calculating or deducing the change in the number products removed from or added to the supply, said calculation or deduction based on the corresponding change in weight of the supply

capturing the product flow data in real time and at a location remote from the outlets;

5 and

depending on the product flow data for each of said outlets, controlling the delivery of product to said outlets to control their inventory.

Preferably the step of capturing the product flow data involves capturing of the data within a database of a remote server which communicates with each of the outlets. More preferably the remote server functions support the control of the delivery of products to the outlets.

Preferably the monitoring of the flow of product is performed without any integration into existing data collection devices, such as a point-of-sale (POS) device.

Preferably the step of capturing the product flow data includes relaying the product flow data in real time from the outlets to the remote server. More preferably this real time relaying of the product flow data is effected by transferring this data across a communications network such as the Internet.

Preferably the remote server communicates with distribution means and the step of controlling delivery of product includes the issuance of delivery instructions to the distribution means depending on the product flow data. More preferably the delivery instructions are directed to a warehouse from which the product is sourced and then delivered to the nominated outlet. Alternately the delivery instructions direct the warehouse to deliver product to a regional depot from which top-up deliveries to the outlets can be effected. Even more preferably the delivery instructions are directed to one outlet of a regional cluster of outlets and whereupon product from said one outlet which has surplus product is delivered to a product-depleted outlet of the cluster. In one embodiment a driver is able to query the delivery instructions from the field via a wireless communications link.

Preferably the method also comprises the step of detecting and sending information relevant to the flow of product at one or more of the outlets to the remote server wherein this information is used to adjust the delivery of product including weather information.

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Preferably the method further comprises the step of sending operational data from the remote server to one or more of the outlets, said operational data including information which assists in determination of the product flow data. More preferably the operational data includes unitary product weights, and the supply of the product weighed relates to product of a substantially identical type and wherein the number of products departing the outlet are calculated by dividing the weight loss by the unitary product weight. Alternately unitary product weight is deduced as a common divisor of a sequence of weight losses and the product count subsequently calculated based on this deduced unitary weight.

Preferably the method further comprises the step of analysing historical data to assist in the forecasting of future product flow. More preferably the historical data used to forecast product flow includes but is not limited to the product flow data and/or weather data. Even more preferably this analysis has a resolution sufficient to forecast product flow patterns within the product shelf life. Still more preferably the analysis can be conducted during a product flow period to forecast product flow with the same product flow period. Generally the outlets are retail stores and the step of monitoring the flow of product involves monitoring the sales of product from each of the stores.

According to a further aspect of the invention there is provided a system for managing product inventory levels, said system comprising:

- means for monitoring the flow of product at the point of display from one or more outlets so as to obtain product flow data for each of the outlets;
- means for capturing the product flow data in real time, said capturing means remotely communicating with the monitoring means;
- means for controlling the delivery of product to said outlets, said control means communicating with the capturing means and being configured to selectively deliver product to one or more of said outlets depending on their respective product flow data at the point of display.

Preferably this counting means includes means for weighting a supply of the product from which the weight loss is measured in order to deduce the number of products removed from the supply and departing the respective outlet.

According to another aspect of the invention there is provided a system for managing product inventory levels, said system comprising:

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means for monitoring the flow of product from one or more outlets so as to obtain product flow data for each of the outlets, said monitoring means including means for measuring changes in the weight of a supply of the product as a result of removal or addition of product from or to the supply;

5 means for calculating or deducing the change in the number of products removed from or added to the supply, said calculation or deduction based on the corresponding change in weight of the supply;

means for capturing the product flow data in real time, said capturing means remotely communicating with the monitoring means;

10 means for controlling the delivery of product to said outlets, said control means communicating with the capturing means and being configured to selectively deliver product to one or more of said outlets depending on their respective product flow data.

Preferably the capturing means includes a remote server including a database within which the product flow data is retained, the remote server communicating with each of the  
15 outlets. More preferably the remote server communicates with the outlets via a communications network, such as the Internet, so that the product flow data can in real time be transmitted to the remote server.

Preferably the monitoring means includes means for counting product departing each of the outlets. More preferably said counting means is independent of a data collection device, such  
20 as a POS device.

Preferably the control means includes distribution means in communication with the remote server, the distribution means being configured to provide delivery instructions to a warehouse from which the product is sourced and delivered to the nominated outlet. Alternately the distribution means is configured to instruct the warehouse to deliver product to a regional  
25 depot from which top-up deliveries to the outlets can be effected. The distribution means may be configured to provide delivery instructions to one outlet of a regional cluster of outlets and whereupon product from said one outlet which has surplus product is delivered to a product-depleted outlet of the cluster.

Preferably the system also comprises historical data analysis means which is configured  
30 to analyse historical data to assist in the forecasting of future product flow. More preferably the historical data used to forecast product flow includes but is not limited to product flow data from the same outlet, product flow data from other outlets and/or weather data. Even more

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preferably said analysis means provides a resolution sufficient to forecast product flow patterns within the product shelf life. Still more preferably the data analysis means can be applied during a product flow period to forecast product flow with the same product flow period.

- 5 Preferably the outlets are retail stores and the product is a sales product. More preferably the sales product has a relatively short shelf life, for example newspapers or perishable goods such as bread.

According to a further aspect of the invention there is provided a method of counting product, said method comprising the steps of:

- weighing a supply of the product;
- 10 measuring changes in the weight of the supply as a result of depletion or addition of product from or to the supply;
- empirically determining the unitary weight of the product by monitoring changes in the supply weight from which a common divisor is calculated and which is assumed to be approximately equal to the unitary weight; and
- 15 calculating or deducing the change in the number of products removed from or added to the supply, said deduction based on the corresponding change in the weight of the supply and the unitary weight.

- Preferably the step of calculating the change in the number of products is performed at a counting processor and the method of counting further comprises the step of relaying the
- 20 changes in the number of products from the counting processor to a remote server. More preferable the remote server includes a database having information pertaining to specific product types and wherein the remote server transmits this information to the counting processor to assist in the calculation or deduction of the change in the number of products.

- 25 Preferably the step of weighing the supply of the product is performed continuously. More preferably the weighing of the supply is conducted by scales communicating with the counting processor and wherein weight information from the scales is continuously or periodically transmitted to the counting processor.

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Preferably the step of calculating the change in the number of products involves dividing the corresponding change in weight by the unitary weight of the product.

5 Preferably the method of counting also comprises the step of identifying the type of product of the supply. More preferably said identification is effected by comparing the unitary weight of the product with a schedule of unitary weights for given product types. Even more preferably this identification step includes matching of the product unitary weight to that of the specified product type in the schedule. Still more preferably the product type schedule resides in the database at the remote server.

10 Preferably the step of measuring changes in the weight of the supply includes time logging of changes in the number of products wherein product turnover for a predetermined period can be calculated, for example the number of products removed in a 24 hour period. More preferably the frequency of change can alone, or together with the step of identifying the type of product by the unitary weight comparison, be used to identify the type of product of the supply wherein the product turnover frequency is compared and matched to a schedule of  
15 turnover frequencies for specified product types. Even more preferably the product turnover schedule is contained in the database at the remove server.

20 Preferably the method of counting also comprises the step of eliminating spurious measurements of noise from the measurement of changes in the weight of the supply. More preferably this is effected by averaging raw weight data from the continuous weighing of the supply.

According to yet another aspect of the invention there is provided a system for counting product, said system comprising:

means for weighing a supply of the product;

25 means for measuring changes in the weight of the supply as a result of removal or addition of product from or to the supply, said measuring means communicating with the weighing means;

means for empirically determining the unitary weight of the product by monitoring changes in the supply weight from which a common divisor is calculated and which is assume to be approximately equal to the unitary weight; and

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means for calculating or deducing the change in the number of products removed from or added to the supply, said calculation or deduction based on the corresponding change in weight of the supply and the unitary weight.

Preferably the means for weighing includes a scale.

5            Preferably the means for measuring changes in the weight of the supply and the means for calculating or deducing the change in the number of products are together included in a counting processor which communicates with the scale. More preferably the scale is one of a plurality of scales each being dedicated to a product type and together communicating with the counting processor.

10           Preferably the system also comprises a remote server communicating with the counting processor, the remote server being configured to receive data pertaining to changes in the number of products removed from or added to the supply. More preferably the remote server includes a database having information relevant to specific product types, and wherein the remote server transmits this information to the counting processor to assist in the calculation or  
15           deduction of the change in the number of products.

Preferably the system also comprises means for identifying the type of product of the supply.

Preferably the system further comprises means for supporting the product supply on the weighing means, the product being dispensable from said support means. More preferably the  
20           support means is designed so that it insulates against external forces other than those associated with the removal or addition of product.

Preferably the weighing means and the counting processor are installed at a store and the product is a sales product which typically has a short shelf life, for example newspapers or perishable goods such as bread.

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## BRIEF DESCRIPTION OF THE FIGURES

In order to achieve a better understanding of the nature of the present invention a preferred embodiment of a method and system for managing product inventory levels together with a method and system for counting product will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a schematic representation of an embodiment of a method and system for managing product inventory levels according to the invention;

Figure 2 a schematic illustration of the method and system of figure 1 in more detail;

Figure 3 is a schematic representation of an embodiment of a method and system for counting product;

Figure 4A and 4B are schematic illustrations of the method and system of figure 3 in more detail;

Figure 5 is a graph of weight versus time for sample data from the system of figure 4A and 4B;

Figure 6 is a graph of weight and product count versus time for the system of figure 4A and 4B; and

Figures 7 and 8 are graphs of the number of products versus the time of day for a sample data output from the system of figure 4A and 4B.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

As best shown in figures 1 and 2 there is a system for managing product inventory levels designated generally as 10.